A Macroeconomic Planning Framework: The Context of Eighth Five Year Plan (1990-1995) in Nepal

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The primary concern of every state, mainly after the Keynesian re-volution in the late 1930s and the World War II in 1940s, has been the safeguard of the interest of common people, and the increase in their quality of life. Although the history of thought about public welfare goes back to many centuries of social evolution, the direct role of state in the capitalist way of managing material, manpower, machine, technology and natural resources was much widened with the introduction of Keynesian-ism.

Instead, socialism has a different history. The philosophy for radi-cal changes in the given social framework was essentially a dominant force that led to the installation of different social structure reflected into the government ownership of the means of production, and hence, its active place in resource management. Everything here was planned from above.

Under the influence of the former, and equally in view of the respects accorded by the international community to the latter, Nepal too felt some leading changes, inclusive of steps taken for political, social and econo-mic progress in 1950s.

Today we are even preparing groundwork for Eighth Plan (1990-95). Even if the past has not been found that promising, it has, nevertheless, remained suggestive or supportive in our drive towards rapid development. Almost all the sectors now are well founded, providing basic infrastruc-tural facilities. This has brought better prospects for the future pace of economic growth, most likely.

In the past, while the government purchases of investment goods like machinery, equipment and other producer durables for agriculture and services were quite impressive, the involvement of the government in the promotion of secondary sector was a bit moderate. Private sector too had been evolving very strongly. As the economy was unable to supply the re-quired quantity of capital goods, manpower and raw and construction mate-rials, result was an overly dependence on foreign sector. Even most of the consumer goods were to be imported from abroad. But since the foreign sector was inefficient and unable to collect resources for payments abroad, we found foreign aid massively increased. Even in the domestic front poli-cies were not as effective as envisaged by various plans. Consequence was low production, low efficiency of factors and overall degraded performance of various sectors. Exchange rate changes too were inadequate in provid-ing attraction to productive sectors, and worked mainly in favour of traders and speculators.

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On the other hand, virtually there was no sign of structural change which directly gives impetus to such productive forces in operation. Agriculture alone remained as a single source of livelihood for the majority, say, more than ninety percent of total population, and supplied around forty percent of exported goods.

More uniquely, however, the share of agriculture in total national income came gradually down to almost below fifty percent, and this is mainly due to government effort to build social and economic infrastructure. The share of tertiary sector in GDP went above one third in 1986.

Similarly, in financial development the nation did a lot of progress. The pace of monetization, consequently, was found quite impressive, but this process was mainly confined to some urban centres and commercial pockets. We did very little in extending banking services and monetary transactions in rural areas. Causes were most likely structural in nature that either the rural economy was stagnant and repressed, or was facing low level equilibrium trap, or was unable even to enjoy basic facilities supplied by the government. Or, it may be also that people there were laggards not responding to any of the government efforts for socio-economic change. It may also be that resource base in villages had been very poor.

All these hold that technological revolution alone is insufficient in bringing notable changes in economic structure conducive to self-sustaining process of growth. Mental revolution too is strongly warranted for the problem of development is connected with social habits, perceptions and practices. Meanwhile, government capacity to deal also with resources, technology and management is not found satisfactory. Planning exercises in the past, therefore, lost consistency in many occasions whereby while certain activities grew at a very high rate, the others remained stagnant. The distribution of investment too was unable to show the basic reality of our economy that agriculture must get sizable amount. When this sector on its own was not generating reasonable amount of surplus income above consumption, government emphasis was for social and economic overhead. Had the private sector responded to such government transfer, agriculture at least in Terai would have been well off. But the risk bearing capacity in rural sector deprived the economy from taking adequate advantage from government support.

In urban areas, still worse anomalies prevailed. Not to talk of corruption, delay and feudal agent's supremacy in administration. The get-quick-rich motive of brilliant investors led the economy to conduct export import business. This was even more encouraged by open frontier between India and Nepal. Eventually, when big business houses invariably followed the practice of sending scarce vehicle currencies abroad, the repulsive forces in villages led poors and educated to leave for India and other urban centres respectively. While the former type of emmigration resulted in the waste of manpower, the latter problem of migrating to urban centres created dual effects. If the backward effect of this was the deficiency of agents for social change in villages, the forward effect was an inability to strike a plausible balance between supply of and the demand for basic facilities in urban centres. Both of these led

to the emergence of environmental problems in Terai, valleys and towns. The economy was virtually put to the paradox in such a way, and the cause was definitely the aspirations for the modern way of social living.

Nevertheless, the forthcoming Eighth Plan must envisage these realities, and propose for a more consistent and comprehensive planning framework.

At the outset, the thrust of the plan in our view must be the growth, efficiency and equity. This must be the only basis in the given situation of ours whose need is not only to increase the size of the cake, but also to provide socio-economic justice needed for the popular support of the people in the democratic process. Unless majority of the people feel that they are well supported economically and given an opportunity for their lively participation in decision making, their faith in government is hopelessly lost. In order to avoid such unwanted situation from coming planning agency must show its commitment to the introduction of the process of decentralization in decision making and also to an adequate sharing of development fruits. This kind of realistic view is held even by our planning authority, reflection of which is explicitly found in the seventh plan document and the plan for the satisfaction of basic needs. While the former is strongly convicted for decentralization, the latter realizes the problem of income sharing by common people.

In view of such tradition set by past plans, we initiate our discussion with the target levels of income and employment. This, we hope, helps eighth plan in maintaining consistent relationships with its predecessors. Besides, as the increase in per capita income or the increase in the source of income (employment) plays a very crucial role in making people better off, utility function is maximized unopposed. Therefore, maximum achievable growth rate of per capita income may be expressed as

$$Pgy = gy - g \text{ pop} \text{ ------------------------------} \quad (1)$$

and $gy/g \text{ pop} > 1$ for the positive growth of Pgy

This holds that as income increases, given population, per capita income must increase, or as population decreases, given income level, we again experience higher per capita income. Thus our problem is how to increase income or reduce the population pressure, other things remaining same. Given the growth of population, income (y) becomes the target variable which must grow (i.e. required) at least by a certain percent so that the level of living is either maintained, or increased moderately. The plan for the satisfaction of basic needs has set target growth rate for the latter purpose.

$$Yt = Yo \text{ } e^{rt} \text{ ------------------------------} \quad (2)$$

where r = growth rate of income (y) fixed by the plan for basic needs satisfaction.

t = time in current year.

The required amount of investment to achieve this target level of income may be known by introducing output to capital ratio (a) approximated on the basis of past experiences, or fixed at the political level in view of the economy's requirement for structural changes, or determined by the capacity of the economy to absorb foreign technology, or given by alternative choice of techniques in production such as with labour or capital intensity.

Given 'a' the overall productivity of capital, expressed as the sum of the changes in incomes in various sectors per unit of total investment, the equation which determines required investment (gross), i.e., I is:

$$Y_t = Y_o + a\,I \quad\text{------------------------------------} \quad (3)$$

Now, again by introducing political parameters b_i's standing for sectoral share in total investment (as in the spirit of Mahalnobi's model for India), and fixed in view of the need for the reallocation of resources (investment) among sectors ($i = 1,2,3 \ldots\ldots\ldots n$) differing in their size, technological adoptations and their placement in the priority list, we distribute this amount of required investment among sectors accordingly

$$\Sigma b_i = 1 \quad\text{------------------------------------} \quad (4)$$

Equation (4) holds that total investment exhausts when it is distributed among sectors (i's).

The question then arises is what level of income is generated in each sector with this investment as made on the basis of our choice of techniques, i.e., with capital or labour intensity. To answer this question, we introduce another equation on the supply side of our system. This equation presupposes that sectoral incomes generated in the process as investment is made are the unknowns that sum up to the change in income at the national level. In its exact form

$$\Delta Y = \Sigma a_i b_i I_t \quad\text{------------------------------} \quad (5)$$

Parameters a_i's and b_i's chosen for various sectors here are the respective reflections of the choice of techniques and the planned allocation of investment according to sectoral needs. If our target is the satisfaction of basic needs, the growth of food sector which not only supplies wage goods, but also employs more of agricultural population and increases export earnings is strictly warranted. For this, we must reallocate more of investment towards this sector. This may be achieved through a change in the composition of b_i's. Similarly, if we want to introduce a high quality technology with capital intensity, a_i's must be reduced through an adjustment in ICOR's. These changes can be introduced in line with our need to alter income level and the productive efficiency of capital inputs, given a fixed proportion of the use of capital and labour, and the labour efficiency. Or, it may also happen that we want to work with same technology (i.e., the same capital intensity), but with higher labour efficiency. In this case, we can adjust b_i's changing sectoral requirement of employment to investment ratios. If

agriculture is expected to work with more of an increase in labour effi-
ciency investment requirement there may be lowered down. This adjusts 'b'
in agriculture, getting lesser amount of investible fund as its share.
Means, more of employment is expected with same amount of investment in
agriculture. This process of readjustment may be even got for other sec-
tors on the basis of the strategy or the intension of the eighth plan.
When the change in income in equation (5) on the supply side is equated
with the total demand in the economy measured within the framework of
national accounting system, and the private consumption is estimated as a
residual amount, our equation becomes

$$\Delta Y = \Delta C + \Delta IP + \Delta G + \Delta TX - \Delta TM \text{ ------------- (6)}$$
And
$$\Delta IP = SP_t - SPt\text{-}1 \text{ -------------------------- (6a)}$$

The government expenditure in this system is determined exogenously,
and is distributed through equation (7)

$$GEt = \sum_{k=1}^{n} Ck\ Gt \text{ ---------------------------- (7)}$$

Where Ck = sectoral share of each category k fixed at the policy
level. If our aim is to work in favour of low income group, more of
government expenditure must be directed for the promotion of social ser-
vices like health and education mostly consumed by poors. This saves in-
come of poors, raises their efficiency (as done by assets owned) and
serves as their source of earnings (the assets). A gradual change in the
ratios of these expenditures during plan period is a matter of strategy
again in the eighth plan. The constraining factors, however, are the
limits fixed by the possible sources of government revenue, foreign aid
and public borrowing. Therefore, the change in the size of G for each
year is determined by its target growth rate times its base year value,
and the target growth rate itself is fixed on the basis of the possible
sources of financing expenditures. This, ultimately, helps in determin-
ing government savings.

$$GSt = GRt - GEt \text{ --------------------------- (8)}$$

And the government revenue GR is again defined by the equation

$$GRt = GRTt + GRNt \text{ ------------------------- (9)}$$

GRN (non-tax revenue) is made determined exogenously by fixing (g),
the assumed growth rate

$$GRNt = GRNo\ (1 + g)^t \text{ ---------------------- (10)}$$

The tax revenue (GRT), on the other hand, can be assumed as a func-
tion of Y. Using Y in our system we can obtain the series of GRT for our
purpose here the equation we write is

$$GRTt = f\ (Yt) \text{ --------------------------- (11)}$$
$$f' > 0$$

The government savings (eq. 8) when is summed with private savings (eq. 12) we obtain total domestic resources (equation 24) available for investment. The private savings (SP) are estimated as

$$SPt = (1-i) Yt \quad\text{------------------------------------ (12)}$$

Where i = marginal propensity to consume (MPC)
And

$$St = GSt + SPt \quad\text{------------------------------ (12a)}$$

Similarly, merchandise imports (M) are assumed as the fraction of income Y; and the policy of self-reliance may be reflected into the adjustment in M/Y ratio (from its base year value).

$$Mt = mYt \quad\text{------------------------------------ (13)}$$

As the meaningful formulation of import policy requires the breakdown of M into two competitive and noncompetitive components for each country of its origin aggregated in imports from SAARC countries and rest of the world, the equations may be specified as

$$Mt = d1\ Mt + d2\ Mt \quad\text{--------------------------- (14)}$$

$$d1 + d2 = 1$$

Where d1 and d2 stand for the fraction of total import (M) composed of competitive and noncompetitive goods respectively.

The adjustment of d1 and d2 ratios may be conceded as the requirement of import substitution and liberalization policy. When the downward adjustment in d1 is likely to represent policy preference, the downward adjustment in d2 is an essential mechanism for the adoption of import substitution policy. Rates of tariff, taxes and subsidies must be handled in the eighth plan accordingly.

Further, import from SAARC members may be again planned on the basis of:

$$Mlt = P1d1Mt + p1d2Mt \quad\text{--------------------- (15)}$$

We can fix values for p1, the planned shares in import from SAARC, and find competitive import from India and other SAARC members as

$$MIt = q1p1d1Mt + q1p1d2Mt \quad\text{-------------------- (16)}$$
and
$$MOSt = q2p1d1Mt + q2p1d2Mt \quad\text{------------------ (17)}$$

Where q1 and q2 are shares in SAARC imports planned for India and other SAARC members.

The share of the rest of the world may be planned for both competitive and non-competitive goods, with an adjustment in p2 (=1-p1).

$$M2t = p2d1Mt + p2d2Mt \text{ ------------------------- (18)}$$

Summing values generated by equations (15) and (18) we find total import in equation (14).

Likewise, we also assume that not all of merchandise exports (X) are determined exogenously. Part of X is determined by internal condition of resource endowments (i.e. supply factor) while rest of the other is determined by world condition of its demand. But since data problem in our context is quite serious, we simply apply our experiences in this regards to divide exports in the said line.Using is for the shares in the base year (preinformation) and assuming its desired adjustment in the plan period, total export becomes an expression:

$$Xt = f1Xt + f2Xt \text{ --------------------------- (19)}$$
and
$$f1 + f2 = 1$$

If we want to have political consideration that these exports are again diverted towards SAARC and rest of the world, we can find expressions for them:

$$X1t = t1 \ f1 \ Xt + t2 \ f1 \ Xt \text{ ----------------- (20)}$$
and
$$X2t = t1 \ f2 \ Xt + t2 \ f2 \ Xt \text{ ----------------- (21)}$$

With t1 and t2 standing for the fractions of supply (f1X) and demand (f2X) determined exports diverted towards country 1 and 2 respectively.

The last equation (21) can be used for the policy dictation for future in respect of (export) demand as the fraction of total exports. Whereas exports in equation (20) are regulated by domestic factor of resource endowments. More explicitly, while the changes in the rates of taxes, tariffs, subsidies, foreign exchange, interest, etc, coming within the perview of price policy may be introduced to encourage exports in equation (21), a policy for an increase in the efficiency of production may help encourage export of goods in the category of equation (20).

The total import and total export of goods and services category is then obtained as

$$TMt = Mt + Mst \text{ ----------------------------- (22)}$$
and
$$TXt = Xt + Xst \text{ ----------------------------- (23)}$$

Service trade (export and import) is again assumed to grow independent of domestic economic conditions, and they are further assumed to be determined by attractive forces of psychological and geographical nature here and elsewhere.

With the help of equations (3), (22) and (23) we can now find savings gap for the 'as a whole of Nepalese economy' during the plan period. For that we write an equation defining an equality between savings and foreign exchange gaps to determine the size of the required domestic savings.

$$It = St + (TMt - TXt) \text{----------------- (24)}$$

Equation (24) represents a special version of the two gap model which holds that external resources fill up the internal savings gap, if any; and this is a relevant argument for the developing economy experiencing with a growing demand for investment goods, for which $\frac{M}{X} > 1$.

Turning, now, to the employment and basic needs income (BNI) aspects, we start with equation (25) defining the additional employment demand as the sum of sectoral employment as the function of output generated in respective sectors.

$$DEt = \sum_{i=1}^{n} ki \ (Yit - Yit - 1) \text{-------------- (25)}$$

Where $k = E/Y$ required to be calculated or assumed for each sector included in the system.

If we want employment implications of investments in various sectors, we use equations (5) and (25) for obtaining equation (25a).

$$DEt = \Sigma \ ki \ \Sigma \ aibiIt \text{----------------------- (25a)}$$

This expresses expected DE as the sum of employment generated for each sector resulting from investments actually made.

The employment coefficients (ki's) for various sectors may be taken as the policy parameter depending upon the desired changes in the sectoral composition of employment demand. The choice of technique for each sector may be viewed as the basis for working with such changes in employment composition. High E/Y would mean low K/Y, but not true for all cases. If investment requirement of roads is high, employment therefrom will increase as well. So, sectors may be identified with complementarities, or substitution relationships between labour and capital. In most of the developing economies complementarities are found as substancial evidence.

The population is assumed to grow at a given rate of n. When the base year value for N, the population, is known, we estimate succeeding N's from (26).

$$Nt = Noe^{nt} \text{------------------------------ (26)}$$

Out of this population, the below poverty line group is defined by the equation (27).

$$NBPlt = (1-s) Nt \quad ------------------------- \quad (27)$$

Where s = population above poverty line.

Once the proportion (s) for the base year is known, it may be taken as a policy parameter. A gradual reduction in poverty may increase the value of 's' overtime, and this narrows a gap between two groups, resulting in zero value by 2000 A.D. - the target of the plan for the satisfaction of basic needs.

Again, we differentiate the population (N) for working and non-working groups to define available labour force. This, we believe, must be a significant step towards defining unemployment problem. Thus total labour force is given by

$$TLFt = (1-j) Nt \quad --------------------------- \quad (28)$$

Where j = coefficient of economically inactive population, either assumed, or obtained from past information.

And the distribution of this labour force among sectors sums to unity.

$$SLFt = \sum_{i=1}^{n} li.TLFt \quad -------------------------- \quad (29)$$

and

$$\sum li = 1$$

Here, li's are sectoral coefficients of labour force distribution, and can be varied according to planning needs. If our policy is to reduce pressure of unemployment in agriculture and to raise employment ratio in other sectors, our approach, or strategy would work through an adjustment in "li's".

Using equations (25) and (29) we define labour market gap in the plan period as:

$$Ut = \sum_{i=1}^{n} li (TLFt - TLft - 1) - \sum_{i=1}^{n} ki (Yit - Yit - 1) \quad ----- \quad (30)$$

If U = 0, planning efficiency is very nicely realized; but if SLF - DE > 0, the U > 0 and unemployment problem is really chronic. Under the latter situation our long-term objective must be either to raise E/Y (=k), or to lower total labour force itself by means of population control, so that the difference is put approximately to zero level.

Coming to the question of poverty alleviation, we first specify an equation for the income share of poverty group.

$$YBPLt = (1 - u) Yt \quad ------------------------- \quad (31)$$

In this equation, 'u' represents the income share of above poverty group, and can be taken as a policy parameter for the plan period.

For the resolution of unemployment problem of below poverty group, we again set a condition in equation (32).

$$EBPLt = (1 - v) DE \quad ------------------------- \quad (32)$$

The condition is that:

$$gB (DE) > gv (DE)$$

This holds that the ratio of the growth of employment for below poverty group gB (DE) to the growth for above poverty group gv (DE) must exceed one. The 'v' in equation (32) is the proportion of employment above poverty group. The information of v may be obtained from past information.

Thus, in this short explanation, we have set the main objective of the eighth plan. To increase per capita income of all in general, and of poverty group in particular. If we are unsuccessful in attaining this, neither the provision of distributive justice is made effective, nor the increase in the efficiency of the economy can be strictly realized. In other words, unless the size of the cake is increased, possibility of reinvestment, or the fulfilment of basic needs is ruled out. Economy, in this situation, will be saddled with low level equilibrium trap; and hence, the question of efficiency gain will not arise.

This plan, therefore, expects to maximise the increase in sectoral output Y as the target variable (eq. 5). This increase in income (Y) level is definitely expected to help the economy in fighting with unemployment problem through equation (25) wherein employment is maximized with increasing output.

Similarly, if equation (30) holds that eradication of unemployment, and hence the poverty is possible through population control, equations 31 and 32 are introduced to explain the role of the changes in income distribution and employment composition in raising the economic position of below poverty group.

Most likely, idea of poverty eradication is made consistent with all these changes. Equations (6), (24) and (30) in the system have been specified in order to clear markets for goods, fund and labour respectively.

Variables determined in equations (1), (3), (5), (6), (6a), (8), (9), (11), (12), (12a), (13), (22), (24), (25), (30), (31) and (32) are unknowns, and the rest of others are exogenously given. Equations other than the ones written for the endogenous variables, as of above, are either statistical constructions, or definitional ones.